

Technetic Plus Countercurrent 1100

Water Conditioning Control System
Dealer Installation, Operation and Maintenance Manual



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Introduction

The Technetic Plus 1100 Control valve provides sophisticated, demand-based water conditioning by incorporating a microprocessor and a water meter to electronically monitor the amount of water used daily. This fully programmable control allows you to fine tune the conditioner's operation to meet your customer's application. The Technetic Plus valve combines design simplicity with reinforced Noryl* construction to provide an uncommonly reliable appliance. The inherent reliability of the system means a long life of efficient, trouble-free water conditioning.

*Noryl is a trademark of General Electric Co.

Special Features

- **Memory Retention.** During a power outage, critical operating information in the control's memory is stored in a special electronic device. This information includes the time of day, water usage amounts, daily average water usage, all programming data and the number of days since the last regeneration. When power is restored, the information is returned to the microprocessor and operation resumes as if an outage never occurred.
- **Battery Backup.** The non-rechargeable battery backup feature allows the control to keep track of time and any water usage for up to 48 hours during a power outage.
- **Fully Programmable Regeneration Cycle Times.** The control is factory programmed with typical regeneration cycle times for easy installation. The control allows the Refill, Rinse, Backwash and Purge cycle times to be set by the installer to fine tune the conditioner's operation.
- **Automatic Double Regeneration for Exhausted Resin Beds.** If the water usage exceeds 150% of the system capacity between regenerations, the control will automatically call for a second regeneration the next day even if no water is used. This feature is included to make sure that an exhausted resin bed is completely recharged.
- **Selectable Reserve Options.** The control can be programmed to operate with one of four different reserve options (see Parameter P15, Table 3.) The options include starting a regeneration only at a specific time of day or having an immediate regeneration when the capacity is exhausted. The control can also have a fixed reserve which is a percentage of the total system capacity or a variable reserve which adjusts the reserve depending upon the water usage patterns of your customer.
- **Separate Time of Day and Time of Regeneration Settings.** The control defaults to a 2:00 a.m. regeneration time for easy installation, but the installer may set the regeneration to occur at any time of the day.
- **WQA S-101 Features.** The control can be programmed to freeze the values for salt amount and capacity so the customer cannot alter them after installation (see Parameter P18, Table 3.)
- **Selectable 12 or 24-Hour Clock.** (See Parameter P13, Table 3.)
- **Selectable U.S. or Metric Units of Measure.** Use grains per gallon of hardness, pounds of salt, and kilograins of capacity for U.S. units. Use milligrams per liter of hardness, kilograms of salt and kilograms of capacity for metric units (see Parameter P12, Table 3.)
- **Selectable Calendar Override.** One to thirty days are available to automatically regenerate the conditioner if the water usage has not caused a regeneration. The default value is zero which disables this feature (see Parameter P14, Table 3.)
- **Design Reliability.** Solid-state electronics assure many years of trouble-free performance. The metering system has only one moving part, the rotating turbine that measures water usage and generates electrical pulses that are counted by the microprocessor to determine the need to regenerate.
- **Guest Cycle.** An extra regeneration can be achieved at any time by pressing the REGEN button on the TechneticPlus front panel. It takes just a few minutes for the regeneration to start. The regeneration process will be completed in about 1 hour, based on the size of the system. This feature is beneficial when the customer expects to use more than the normal amount of water; for example, guest visits or an extra heavy laundry day.
- **Manual Double Regeneration.** Back-to-back regenerations can be run by pressing the REGEN push button after the first regeneration has been running for at least one minute.

Superior Design

- Hybrid Distribution System keeps resin compacted and maximizes salt efficiency.
- Clear aircheck provides viewing of brine draw and refill functions and eliminates the need for an external brine valve.
- Patented proportional brining regenerates only the exhausted portion of the resin bed for maximum salt efficiency.
- Fewer parts than any control system of comparable function and most controls of lesser function.
- The valve may be indexed manually without power to any one of its service or regeneration positions. The Regeneration Cycle indicator on the cam gear indicates control valve position.
- No dynamic seals that could cause leakage through wear or fatigue.
- Control accepts a wide selection of plumbing connections or modular bypass valves offering complete versatility and easy plumbing for any installation.
- Drain flow control is built into the valve to control backwash flow rate. Not included on Model 1130 or 1150FA.

Superior Operation

- Direct acting system functions independently of water pressure. No pistons or diaphragms that require a minimum water pressure to operate.
- Five-cycle operation provides for down-flow conditioned water, soft water refill of the brine tank, up-flow brining and slow rinse, up-flow backwash and down-flow fast rinse.
- Valve discs are held closed by water pressure and are leak tight. Valve seats are in a vertical position, which is the position least vulnerable to plugging.
- System operation cannot get out of phase or sequence. The control always returns to a fixed conditioned water position after regeneration.
- Bypass water is automatically available during regeneration.
- Soft water is used for brine refill.

Installation

All plumbing must conform to local codes. Inspect the unit carefully for carrier shortage or shipping damage.

Location Selection

The following considerations must be taken into account when selecting the location for the water conditioning system.

- Locate the unit as close to a drain as possible.
- If supplementary water treating equipment is required, make sure that adequate additional space is available. Locate the brine tank in an accessible place so that salt can be added easily.
- Do not install any unit closer than 10 feet (3 m) between the outlet of the conditioner and the inlet of water heater. Water heaters can transmit heat back down the cold water pipe into the control valve. Hot water can severely damage the conditioner. A positive way to prevent hot water from flowing from a heat source to the conditioner is to install a check valve in the soft water piping from the conditioner. If a check valve is installed, make sure that the water heating unit is equipped with a properly rated temperature and pressure safety relief valve. Always conform to local codes.
- Do not locate the unit in a area where the temperature falls below 34°F (1°C) or over 120°F (49°C)
- Do not install the unit near acid or acid fumes.
- Do not expose the unit to petroleum products.

Water Line Connection

A bypass valve system must be installed since there are occasions when the water conditioner must be bypassed for hard water or for servicing. The most common bypass systems are the TechneticPlus bypass valves. Figure 1, and plumbed-in globe valves, Figure 2. Though both are similar in function, the TechneticPlus bypass offers simplicity and ease of operation.

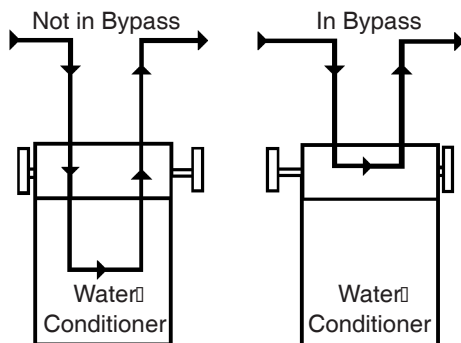


Figure 1

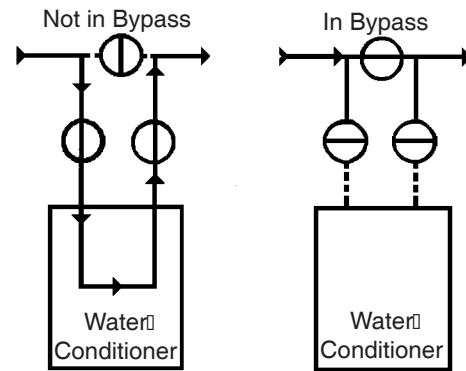


Figure 2

Drain Line Connection

Ideally located, the unit will be above and not more than 20 feet (6.1 m) from the drain. For such installations, using an appropriate adapter fitting (not supplied), connect 1/2-inch (1.3-cm) plastic tubing to the drain line connection of the control valve.

If the unit is located more than 20 feet (6.1 m) from the drain, use 3/4-inch (1.9-cm) tubing for runs up to 40 feet (12.2 m). Also, purchase appropriate fitting to connect the 3/4-inch tubing to the 1/2-inch NPT drain connection.

If unit is located where drain line must be elevated, you may elevate the line up to 6 feet (1.8 m) providing the run does not exceed 15 feet (4.6 m) and water pressure at the filter is not less than 40 psi (280 bar). You may elevate an additional 2 feet (61 cm) for each additional 10 psi (70 bar).

Where the drain line is elevated but empties into a drain below the level of the control valve, form a 7-inch (18-cm) loop at the far end of the line so that the bottom of the loop is level with the drain line connection. This will provide an adequate siphon trap.

Where a drain empties into an overhead sewer line, a sink-type trap must be used.

IMPORTANT: Never connect drain line directly into a drain, sewer line or trap. Always allow an air gap between the drain line and the wastewater to prevent the possibility of sewage being back-siphoned into conditioner.

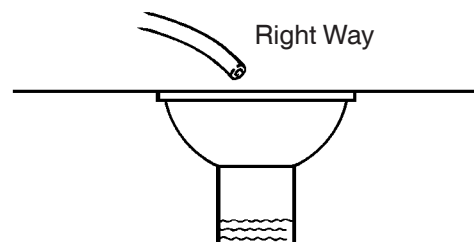


Figure 3

Note: Standard commercial practices have been expressed here. Local codes may require changes to these suggestions.

Brine Line Connection

Install the brine line between the pickup tube in the brine tank and the 3/8-inch tubing nut on the air check of the control valve.

Note: Make sure that all fittings and connections are tight so that premature checking does not take place. Premature checking occurs when the ball in the air check falls to the bottom before all brine is drawn out of the brine tank. Refer to the **Troubleshooting** section in this manual for additional information.

Brine Tank Overflow Line Connection

In the event of a malfunction, the brine tank overflow connection directs overflow to the drain instead of spilling on the floor where it could cause water damage:

1. Locate the fitting hole on the side of the brine tank.
2. Insert the overflow fitting (not supplied) into the tank and tighten with the plastic thumb nut and gasket as illustrated in Figure 4.
3. Attach a length of 1/2-inch (1.3-cm) tubing (not supplied) to the fitting and run to the drain.

Note: Do not elevate the overflow line higher than 3 inches (7.6 cm) below the bottom of the overflow fitting. Do not tie into the drain line of the control unit. The overflow line must be a direct, separate line from the overflow fitting to the drain, sewer, or tub. Allow an air gap as the drain line connection (Figure 3).

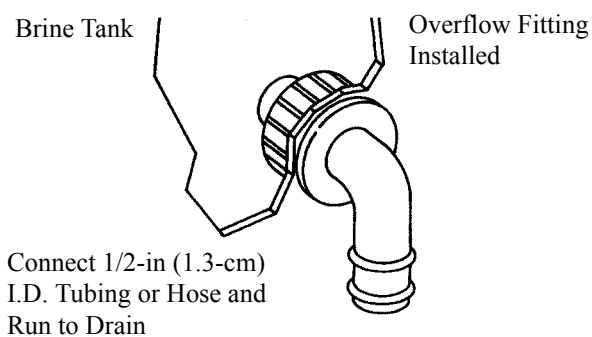


Figure 4

Brine Tank and Salt Selection

The TechneticPlus is designed to operate with a wet salt system. Do not use a grid plate (salt shelf) in the brine tank. High quality salt is recommended. Do not use block salt.

Connecting the Control

1. Connect the control to the 12-volt wall transformer cable.

The power connection is located on the underside of the control on the left front side. Insert the barrel style connector into the power plug.

2. Plug the wall-mount transformer into an electrical outlet that is not controlled by a wall-switch.

Increasing the Length of the Transformer Cord

If it is necessary to extend the length of the transformer cord, an optional 15-foot (4.6-m) extension cord is available, P/N 1000907, Figure 5 or the cord may be spliced as follows:

1. Strip insulation from wire 5/16 inch (7.87 mm) from wire end.
2. Insert stripped wire into barrel of connector and crimp. For best results, crimp twice per wire as shown Figure 6.

Splice connections or extension wire is not supplied. They are available at hardware or electrical stores.



Figure 5

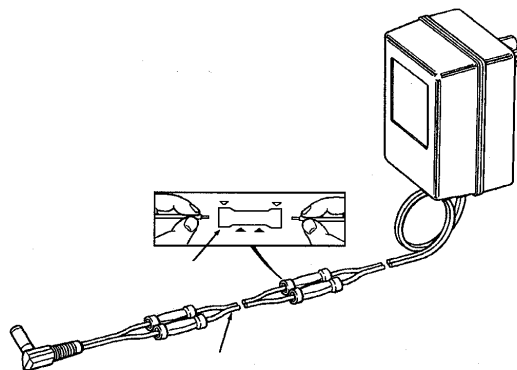


Figure 6

There is also a 15-foot splitter cord (not shown) to use one transformer to operate two 12-volt controls, P/N 1034264.

Placing Conditioner into Operation

Initial Start-Up

After the water conditioning system is physically installed, we recommend that the conditioner be disinfected before it is used to treat potable water. Refer to the **Disinfection of Water Conditioners** section in this manual. Complete the following steps to place the conditioner into operation:

1. Remove the control valve cover by grasping each side of

the cover at the bottom, towards the back. Spread the sides apart slightly and lift off. Figure 7.

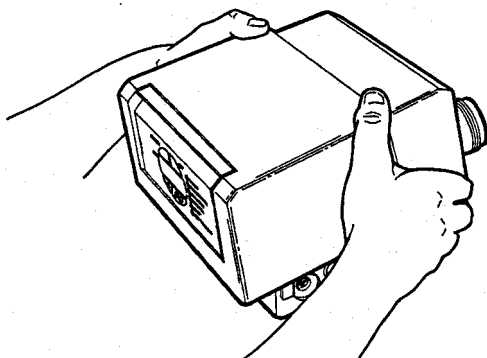


Figure 7

2. Disconnect power to the control by unplugging the wall transformer or removing the power wire from the bottom of the control.
3. Turn off the water supply and place the bypass valve(s) in the "not in bypass" position.
4. Press down on the top of the drive gear to disengage the cam gear, Figure 8.

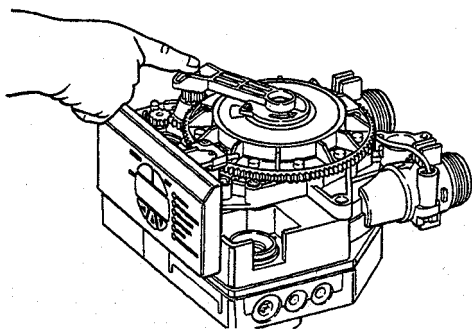


Figure 8

5. With the cam gear disengaged, rotate the cam gear counterclockwise to the Backwash position, Figure 9.

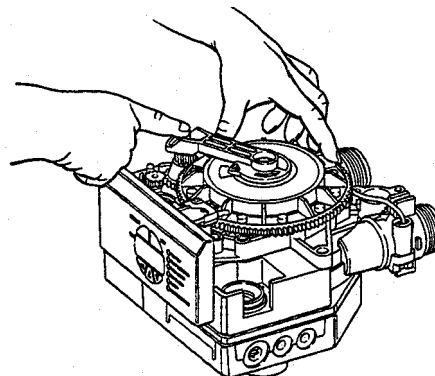


Figure 9

6. Open the water supply valve very slowly to approximately the 1/4-open position, and slowly fill the resin tank with water.

Note: If the water supply valve is opened too rapidly or too far, resin may be lost. In the BACKWASH position, you should hear air escaping slowly from the drain line.

7. When all the air is purged from the resin tank (water begins to flow steadily into the drain), slowly open the main supply valve all the way. Allow the water to run into the drain until clear. Turn off the water supply and wait for about five minutes to allow all trapped air to escape from the tank. Open the water supply valve slowly to the full open position.
8. Press down on the top of the drive gear to disengage the cam gear, Figure 8.
9. With the cam gear disengaged, rotate the cam gear counterclockwise to just before the Service position, Figure 9. Connect power to the control and allow the motor to drive the cam gear to the Service position. When the cam gear reaches the Service position, the motor will stop.

Checking the Brine Draw and Refill Functions

1. Disconnect power to the control by unplugging the wall transformer or unplugging the power cord from the bottom of the control.
2. Press down on the top of the drive gear to disengage the cam gear. Figure 8.
3. With the cam gear disengaged, rotate the cam gear counterclockwise to the Refill position until the air check, Figure 10, fills with water, and water flows through the brine line into the brine tank. Do not run for more than three minutes.
4. Press down on the drive gear, and rotate the cam gear counterclockwise to the Draw/Rinse position. Check that water is being drawn from the brine tank. The water level in the brine tank will recede very slowly. Observe the water level for at least one minute. If the water level does

not recede, if it goes up, or if air enters the transparent air check chamber and the ball falls and seats, refer to the **Troubleshooting** section in this manual.

5. When water is being drawn from the brine tank, press down on the drive gear and rotate the cam gear counterclockwise to just before the Service position, Figure 10. Connect power to the control and allow the motor to drive the cam gear to the Service position, the motor will stop. Run cold water from a nearby faucet until the water is clear and soft.

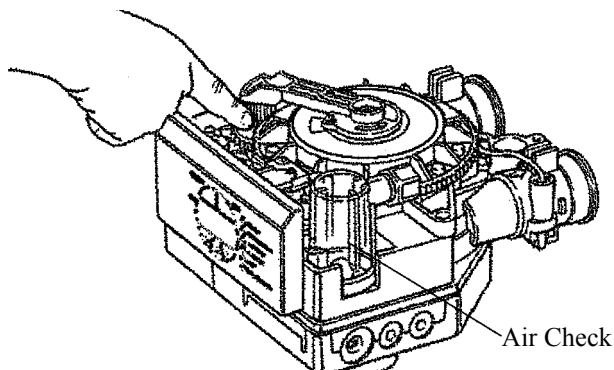


Figure 10

Battery Back-Up Feature

The Technetic Plus 1100 is supplied with a battery operation feature allowing the control to continue to monitor water flow and maintain the proper time of day during short power outages. The control uses a standard 9-volt battery (not supplied).

During a power outage, the display will be turned off and the motor will not run, but the control will continue to totalize water flow. If power is out and a regeneration is needed, the regeneration will be delayed until power is restored. If power is lost during a regeneration, the control will resume the regeneration when power is restored.

A typical new 9-volt alkaline battery will provide approximately two days of power for the control. Older batteries or those exposed to temperatures over 75°F (23.9°C) will provide power for a shorter length of time.

The control can be operated without a battery, but the control will not measure water usage or time while the power is off. The control will save all important operating information and programming data during a power outage. No reprogramming is necessary.

Note: It is recommended that the battery be replaced every year or after any extended power outage.

To install a battery:

1. Remove the cover of the Technetic Plus 1100.
2. The battery pocket is located in the upper left corner of the control.

3. The battery connector has special snaps which allow the battery to be installed properly. Press the new battery firmly into the snaps.
4. Place the battery into the pocket.
5. Replace the valve cover.

Programming the Technetic Plus 1100 Control

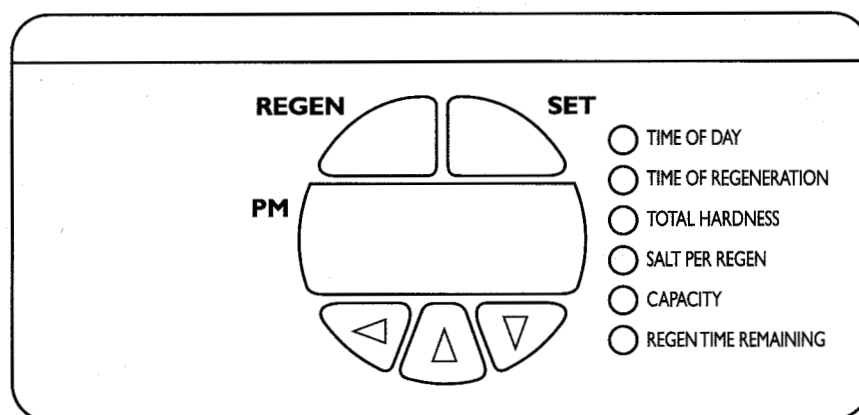


Figure 11

This section covers all aspects of programming the control. The control is shipped from the factory with default values for most parameters. These default values will result in a system capacity of 100 gallons (1 cubic meter). While the control may operate with these values, the following parameters must be changed to meet the actual operating conditions and achieve maximum system capacity and salt efficiency:

- Time of Day
- Time of Regeneration
- Hardness
- Salt Amount
- Capacity of the Unit
- Refill Controller Value
- Brine Draw Rate
- Slow Rinse Time

Note that some parameters have a single unit of measure option such as the Slow Rinse Time which is only entered in minutes. Other parameters have dual units such as Salt Amount which can be entered in pounds or kilograms. To select which units are active, look for a comment in the NOTES column of Tables 1 and 3. It will reference another parameter that selects which units are active. For example, parameter P12 (Table 3) selects U.S. units if it is set to “0” and metric if it is set to “1”.

Level I Parameters (Table1)

Level I Parameters are identified as those that have an LED indicator on the front panel. The green indicator illuminates next to the name of the active control setting. The end user has access to all of these parameters which are explained in the Technetic Plus Operation and Maintenance Manual. In general, pressing the down (↓) arrow button displays the Level I Parameters in the following order:

- Time of Day

- Time of Regeneration
- Hardness
- Salt Amount
- Capacity

If you continue to press the down arrow (↓) button, the parameters start over with Time of Day. Pressing the up arrow (↑) button displays the parameters in reverse order. Refer to Table 1 for description of these parameters and available ranges for each parameter.

Press the **SET** button and the far right digit of the display starts flashing. If you want to change this number, press the up arrow (↑) button to increase the number or the down arrow (↓) button to decrease the number. To skip the number without changing, press the left arrow (←) button. When you reach the far left digit, pressing the left arrow (←) button will return you to the far right digit.

Note: If you press and hold either the up arrow (↑) button or the down arrow (↓) button for more than one second, the flashing number will increment or decrement at the rate of 10 counts per second.

When the number is correct, press the left arrow (←) button. The far right digit stops flashing and the next digit to the left starts flashing. **You can only change the flashing number.** Continue changing numbers until you reach the desired setting. Press the **SET** button. The numbers stop flashing and the control accepts the new setting. After approximately 30 seconds, the control starts alternating the display between Time of Day and Capacity.

Note: If the new setting is not accepted because it was outside the allowable range, the old value will be displayed.

Time of Day

Press the **SET** button. The display will show the Time of Day with the minutes digit blinking. If you want to change this number, press the up arrow (↑) button to increase the number

or the down arrow (↓) button to decrease the number. To skip the number without changing, press the left arrow (←) button. The first number stops flashing and the next number starts flashing. **You can only change the flashing number.** When you have reached the far left digit, pressing the left arrow (←) button returns you to the far right digit. Continue changing numbers until you reach the desired setting. Press the **SET** button again to enter the value.

Time of Regeneration

The next value displayed is the Time of Regeneration, it is similar to **Time of Day** programming. It has the default value of 2:00 a.m. If 2:00 a.m. is acceptable, press the down arrow (↓) button. If this is not acceptable, press the **SET** button and change the numbers. Press the **SET** button again to enter the value.

Hardness

Hardness is the next value displayed. This value is the water hardness expressed in grains per gallon (milligrams per liter). The default value is 10 grains/gallon (100 milligrams per liter). If this is not acceptable, press the **SET** button and enter a new value. Any value between 3 and 250 grains per gallon (30 and 2500 milligrams per liter) is allowed. Press the **SET** button again to enter the new value.

Salt Amount

Salt Amount is the next value displayed. The default value for Salt Amount is 6 pounds (2.5 kilograms) of salt. Refer to Table 2, and select a salt dosage based on resin bed volume and desired system capacity.

Note: This is the total amount of salt for a regeneration, not pounds per cubic foot. If 6 pounds is not acceptable, press the SET button and change the value. If 6 pounds is acceptable, press the down arrow (↓) button.

Capacity

Capacity is the next value displayed and is expressed in kilograins (kilograms). Refer to Table 2 for the capacity setting that corresponds to the resin bed volume and salt amount. The default value is 1.0 kilograin (0.1 kilograms). To change, press the **SET** button and enter a new value. Any value between 0.1 and 140 kilograins (0.01 and 14.00 kilograms) is allowed.

Note: If the calculation for the system capacity exceeds 9999 gallons (99.99 cubic meters) (P5, Capacity, divided by P3, Hardness), the control will display 9999 (99.99) for capacity until the water usage has dropped the remaining capacity below that number. When water is flowing through the system, the colon in the Time of Day display will blink.

At this time, all of the Level I parameters are programmed. The display will alternate between the Time of Day and Capacity if no keys are pressed for 30 seconds. The Capacity value displayed is the volume remaining in gallons (cubic meters for metric) before a regeneration is needed.

To complete the initial programming of the Technetic Plus 1100, proceed to the **Level II Parameters**, page 13.

Table 1 - Level 1 Programming Parameters

Parameter		Range of Values	Minimum Increments	Default	Units of Measure	Notes
Name	Description					
P1	Time of day AM or PM	1:00 to 12:59 00:00 to 23:59	1	None	Hour:minute	Range depends on value selected for P13. Enter the current time.
P2	Time of day of regeneration	1:00 to 12:59 AM or PM 00:00 to 23:59	1	2:00 AM	Hour:minute	Range depends on value selected for P13. Skip this parameter to accept the default or enter a new time.
P3	Hardness of Water	3 to 250 30 to 2500	1 10	10 100	Grains/gallon milligrams/L	Unit of measure depends on value selected for P12. Test water hardness (compensated hardness) and enter that value.
P4	Salt amount	0.5 to 99.5 0.1 to 25.5	0.5 0.1	6 2.5	Pounds Kilograms	Unit of measure and default depends on value selected for P12. Select salt amount from Table 2 and enter that value.
P5	Capacity of unit	0.1 to 140.0 0.01 to 14.00	0.1 0.01	1.0 0.1	Kilograins Kilograms	Unit of measure depends on value selected for P12. Enter the unit capacity. Refer to Table 2.

Table 2 - Technetic Plus 1100 System Capacity Inputs (Kilograins)

Salt Setting (pounds)	RESIN VOLUME (cubic feet)										3.50
	0.50	0.75	1.00	1.25	1.50	2.00	2.25	2.50	3.00	3.25	
2.5	7.5	9.0	10.5								
3.0	8.4	9.9	11.4	12.9							
3.5	9.3	10.8	12.3	13.8							
4.0	9.9	11.7	13.2	14.7	16.2						
4.5	10.2	12.6	14.1	15.6	17.1						
5.0	10.5	13.5	15.0	16.5	18.0	21.0					
5.5	10.8	14.4	15.9	17.4	18.9	21.9	23.4				
6.0	11.1	14.9	16.8	19.8	22.8	24.3	25.8	25.8			
6.5		15.2	17.7	19.2	20.7	23.7	25.2	26.7			
7.0		15.5	18.6	20.1	21.6	24.6	26.1	27.6			
7.5		15.8	19.5	21.0	22.5	25.5	27.0	28.5	31.5		
8.0		16.1	19.8	21.9	23.4	26.4	27.9	29.4	32.4	33.9	
8.5		16.4	20.1	22.8	24.3	27.3	28.8	30.3	33.3	34.8	36.3
9.0		16.7	20.4	23.7	25.2	28.2	29.7	31.2	34.2	35.7	37.2
9.5		17.0	20.7	24.5	26.1	29.1	30.6	32.1	35.1	36.6	38.1
10.0		17.3	21.0	24.8	27.0	30.0	31.5	33.0	36.0	37.5	39.0
10.5			21.3	25.1	27.9	30.9	32.4	33.9	36.9	38.4	39.9
11.0			21.6	25.4	28.8	31.8	33.3	34.8	37.8	39.3	40.8
11.5			21.9	25.7	29.4	32.7	34.2	35.7	38.7	40.2	41.7
12.0			22.2	26.0	29.7	33.6	35.1	36.6	39.6	41.1	42.6
12.5			22.5	26.3	30.0	34.5	36.0	37.5	40.5	42.0	43.5
13.0			22.8	26.6	30.3	35.4	36.9	38.4	41.4	42.9	44.4
13.5				26.9	30.6	36.3	37.8	39.3	42.3	43.8	45.3
14.0				27.2	30.9	37.2	38.7	40.2	43.2	44.7	46.2
14.5				27.5	31.2	38.1	39.6	41.1	44.1	45.6	47.1
15.0				27.8	31.5	39.0	40.5	42.0	45.0	46.5	48.0
15.5				28.1	31.8	39.3	41.4	42.9	45.9	47.4	48.9
16.0				28.4	32.1	39.6	42.3	43.8	46.8	48.3	49.8
16.5					32.4	39.9	43.2	44.7	47.7	49.2	50.7
17.0					32.7	40.2	44.1	45.6	48.6	50.1	51.6
17.5					33.0	40.5	44.3	46.5	49.5	51.0	52.5
18.0					33.3	40.8	44.6	47.4	50.4	51.9	53.4
18.5					33.6	41.1	44.9	48.3	51.3	52.8	54.3
19.0					33.9	41.4	45.2	48.9	52.2	53.7	55.2
19.5							45.5	49.2	53.1	54.6	56.1
20.0							45.8	49.5	54.0	55.5	57.0

	Ultra High, greater than 4000 grains per pound
	High, 3500 - 4000 grains per pound
	Standard, Less than 3500 grains per pound

Table 3 - Level II Programming Parameters

Parameter		Range of Values	Minimum Increments	Default	Units of Measure	Notes
Name	Description					
P6	Refill Controller	1 to 99	1	33		Select value from Table 4 and enter that number.
P7	Brine draw value	1 to 99	1	25		Select Brine Draw value from Table 4 and enter that number.
P8	Not used	N/A	N/A	N/A	N/A	N/A
P9	Backwash time	3 to 30	1	14	Minutes	Skip this parameter to accept the default or enter a value.
P10	Slow Rinse time	8 to 125	1	40	Minutes	Select Time from Table 4 and enter that value.
P11	Fast Rinse time	2 to 19	1	4	Minutes	Skip this parameter to accept the default or enter a value.
P12	Units of measure	0 to 1	1	0		0 = U.S., 1 = metric. Skip this parameter to accept U.S. or enter 1 for metric.
P13	Clock mode	0 to 1	1	0		0 = 12-hour clock, 1 = 24-hour clock. Skip this parameter for a 12-hour clock or enter 1 for a 24-hour clock.
P14	Calendar override	0 to 30	1	0	Days	0 = no calendar override. Skip this parameter for no calendar override or enter a value.
P15	Reserve type	0 to 3	1	0		0 = variable reserve, 1 = fixed reserve, 2 = variable reserve with immediate regen, 3 = fixed reserve with immediate regen. Skip this parameter to accept the default or enter a different reserve type.
P16	Fixed reserve capacity or initial average value	0 to 70	1	30	Percent of capacity	Description depends on the value entered for P15. Skip this parameter to accept the default or enter a different value.
P17	Operation type	0 to 1	1	1		0 = Not used, 1 = 5 cycle counter current, partial salting.
P18	Salt/Capacity change lock out	0 to 1	1	0		0 = none, 1 = salt/capacity change locked out. Skip this parameter to accept the default or enter 1 to lock out salt/capacity change.
P19	Factory defaults	0 to 3	1	9		Loads in factory default values. Do not change this parameter.

Level II Parameters

The programming in Level II is critical to the operation of the Technetic Plus 1100 Control.

Refill control value P6, brine draw value P7, and slow rinse time P10 must be programmed according to conditioner system size using Table 4. Other programming parameters in Level II can be used to increase the efficiency of the water conditioning system.

The Operating and Maintenance Manual for this product does not mention these parameters, so the end user does not normally have access to these values. To access Level II Parameters, simultaneously press and hold the down arrow (↓) and up arrow (↑) button for three seconds.

If the control was alternating between Time of Day and Capacity when the above button sequence is entered, the display shows P1. If a different Level I Parameter was displayed, the display shows the “P” number for that parameter. Refer to Table 3 to find the “P” number associated with each parameter.

Use the up arrow (↑) button or the down arrow (↓) button to move from one parameter to the next. The display cycles through the “P” numbers shown in Tables 1 and 3. When you

reach P19, the display will go back to P1.

When the parameter number you want to change is displayed, press the left arrow (←) button to display the data assigned to that parameter. Press the **SET** button and the far right digit on the display starts flashing. If you want to change this number, press the up arrow (↑) button or the down arrow (↓) button. To skip the number without changing, press the left arrow button. When the number is correct, press the **SET** button. The numbers stop flashing and the control accepts the new setting. If the new setting was not accepted, the display will show the previous setting. Refer to Table 3 for allowable values for that parameter.

To change or view other parameters, press the left arrow (←) button to have the display show “P” numbers. Now use the up arrow (↑) button or the down arrow (↓) button to move to the parameter number you wish to change.

To exit the Level II programming mode, simultaneously press and hold the down arrow (↓) and up arrow (↑) buttons for three seconds, or wait 30 seconds, without pressing a button. The control starts alternating the display between Time of Day and Capacity.

Table 4 - Technetic Plus System Sizes

Tank Sizes		Resin Volume		Refill Controller	Brine Draw Value	Slow Rinse Time
Inches	Metric	Ft ³	Liters			
7x35	18x89	0.50	15	14	9	67
7x40	18x101	0.50	15	14	9	67
8x40	21x101	0.75	21	14	7	83
8x44	21x112	0.75	21	14	7	83
9x35	23x89	0.75	21	33	9	70
9x48	23x122	1.00	28	33	9	94
10x35	26x89	1.00	28	33	15	53
10x44	26x112	1.25	35	33	15	67
10x47	26x119	1.25	35	33	15	67
10x54	26x137	1.50	44	33	15	80
12x48	30x122	2.00	56	33	16	83
12x52	30x132	2.25	64	33	16	94
13x54	33x137	2.50	71	33	18	107
14x47	35x119	2.50	71	33	21	60
14x65	35x165	3.00	85	33	21	72
14x65	35x165	3.25	91	33	21	78
14x65	35x165	3.50	99	33	21	84

Refill Control

Each Technetic Plus control valve is supplied with a refill/backwash control based on the water conditioner system size. To verify that the correct control is installed, check the number located on the face of the refill/backwash control, Figure 12. This number should match the diameter of the resin tank. To operate correctly, the control must have parameter P6 programmed to the correct refill controller value. The default value in P6 is 33. Find the correct value in Table 4. If 33 is not correct, press the **SET** button and enter the correct value from Table 4.

Note: Do not overtighten the plastic cap. Seat the cap lightly into position. Overtightening may cause breakage of the plastic cap that may not be immediately evident.

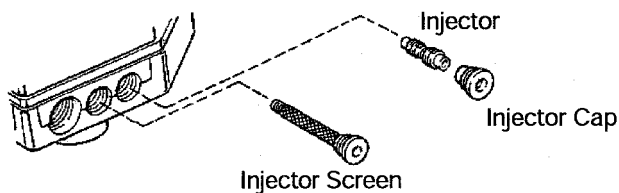


Figure 12

Brine Draw Value

Brine draw value P7 is used by the control to calculate the brine draw time. The brine draw value is an estimate of the flow rate of brine through the injector. This value varies with injector size and conditioner system size. The default value in P7 is 25. Refer to Table 4 and find the correct brine draw value for your conditioner system. Press the **SET** button and enter a new brine draw value from Table 4.

- The control does not use parameter P8. No entry is needed for this parameter.
- Parameter P9 is used to set the backwash time in minutes. The default in P9 is 14 minutes. If a different backwash time is desired, press the **SET** button and enter a new value.

Slow Rinse Time

Parameter P10 determines the slow rinse time, which is based on conditioner system size. The default value for P10 is 40 minutes. Refer to Table 4 to find the correct slow rinse time for your conditioner system. Press the **SET** button and enter a new value for P10.

- Parameter P11 determines the fast rinse time. The default value is 4 minutes. If a different fast rinse time is desired, press the **SET** button and enter a new value.
- Parameter P12 selects the units of measure. Be sure that

this is set to the correct value before entering any data for parameters P3, P4, or P5.















- Parameter P13 selects the clock display mode. If the 12-hour mode is selected, a PM indicator is used. If the 24-hour mode is selected, the PM indicator is not used.
- Parameter P14 is used to set the calendar override feature. The default value is zero. If set to zero, the feature is disabled. Refer to **Calendar Override**, page 16 for more information on the calendar override feature.
- Parameter P15 selects a variable reserve type, 0 to 3. For more information on reserve options, refer to Page 17.
- Parameter P16 is used to calculate the initial average daily water usage values. The control multiplies the total capacity by the percentage entered for Parameter P16 and uses that value as the initial average daily usage for each day of the week until water usage establishes new averages. The default is set for 30% of the capacity. In most installations this is acceptable.
- Parameter P17 has been preset to 1. **Do not change this setting.** P17 must be set to 1 for 1100 operation. Improper regenerations will occur if P17 is set to 0.
- Parameter P18 allows the installer to lock the Salt Amount and Capacity values so they cannot be changed. When Parameter 18 is set to 1, those two settings can only be viewed when the control is in the Level II mode. The settings will be skipped when the control is in the Level I mode. When Parameter 18 is set to zero, the Salt Amount and Capacity can be viewed and changed in either Level I or Level II.
- Parameter P19 is used at the factory to enter default values. **This parameter does not need to be changed.** Using this parameter will erase the values for all other parameters and replace them with default values. **Improper regenerations will occur if P19 is set to a 0 or 3.** P19 should be set on default number 9.

Notes on Technetic Plus Efficiencies

In order to consistently achieve the system capacities and salt efficiencies listed in Table 2, it may be necessary to change the injector assembly supplied with the Technetic Plus. Each Technetic Plus control valve is supplied with a standard “low pressure” injector assembly based on system tank diameter. This injector assembly is intended for system applications with working water pressures below 60 psi. For system

applications with working pressure above 60 psi, remove the “low pressure” injector and install an alternate “high pressure” injector. The injectors are coded according to size by the number of “bumps” molded onto the end of the injector. Refer to Table 5 to find the correct injector based on tank diameter and water pressure. To order replacement injectors use the 7-digit part numbers indicated.

Table 5 Injector Selection

Water Pressure	Resin Tank Diameter, Inches (centimeters)						
	7 (17.8)	8 (20.3)	9 (22.8)	10 (25.4)	12 (30.5)	13 (33)	14 (35.5)
20 to 60 psi (138 to 414 bar)							
	2 1032984	3 1032979	4 1032977	5 1032980	6 1032982	7 1032981	8 1032983
61 to 120 PSI (420 to 827 bar)							
	1 1032976	2 1032984	3 1032979	4 1032977	5 1032980	6 1032982	7 103281

Regeneration

When the control begins a regeneration, the display will alternate between Time of Day and Regen Time Remaining. The Regen Time Remaining is shown in minutes. The control will start and stop an internal motor which drives the cam gear through the various regeneration positions. The control uses the information entered in the parameters shown in Table 3 to determine how long each part of the cycle should last.

If power fails during a regeneration cycle, the cycle completes normally when the power is restored.

Note: The REGEN button is only active when the display is alternating between Time of Day and Capacity. When programming Level I or II parameters, the REGEN button is not active.

The Regen Time Remaining in regeneration will continue to count down until the cam gear reaches the Service position.

Manual Regeneration

To initiate a manual regeneration, press the REGEN button. This button is located on the front of the control. When you press the REGEN button, the control performs a full regeneration of the conditioner.

If you press this button again more than one minute after regeneration begins, but before the regeneration is complete, a second regeneration will start when the first regeneration is finished.

The display will freeze and only show the Regen Time Remaining as an indication that the second regeneration will be performed. When the first regeneration is complete, the second one will begin and the display will alternate between

Time of Day and Regen Time Remaining.

Automatic Regeneration

There are two ways to have the control automatically initiate a regeneration: calendar override or normal metered water usage.

Calendar Override

This feature is set in parameter P14. It can be set for 1 to 30 days. If it is set to zero, this feature is disabled. When this feature is active, the control keeps track of the number of days since the last regeneration and when that number equals the value set in P14, a regeneration is automatically started at the Time of Regeneration set in P2.

Normal Metered Water Usage

The control compares the water usage to the calculated volume capacity of the system. The control uses the Capacity parameter P5 divided by the Hardness parameter P3 to calculate the volume capacity of the system. It also uses a reserve value to determine if a regeneration is necessary. If the water usage since the last regeneration is greater than the system capacity minus the reserve, a regeneration is needed.

Note: If the water usage exceeds 150% of the system capacity between regenerations, the control will automatically call for a second regeneration the next day even if no water is used. This feature is included to make sure that an exhausted resin bed is completely recharged.

Reserve Options

There are two types of reserve options for this control: fixed reserve and historical water usage pattern. They are selected

with parameter P15.

Fixed Reserve

When the fixed reserve is selected, the control multiplies the maximum system capacity by the percent value set in parameter P16 and uses the result as a reserve.

Water Usage Pattern

The other reserve option allows the control to adjust the reserve based upon the historical water usage pattern of the system. The control keeps track of the water usage for each day of the week and uses that day's average usage multiplied by 1.2 as the reserve for that day. Every day at the Time of Regeneration, the control recalculates the day's average water usage. If less than 10% of a day's average water usage is used, the control will not change the day's average. If more than twice the day's average is used, the control uses the actual usage in the reserve calculation.

Since a new installation has no history of water usage, the control multiplies the percent of capacity value set in parameter P16 by the total system capacity to determine starting average for each day of the week. The factory set default value for P16 is 30 which means that 30% of the total system capacity is used for the starting average for each day.

Program parameter P15 is also used to select whether the control waits until the Time of Regeneration set in parameter P2 to start a regeneration, or if the control should begin a regeneration immediately when the capacity remaining is less than the reserve.

Service and Preventative Maintenance

Injector Screen, Injector and Refill/Backwash Control

All maintenance items are located on the lower right side of the valve. See Figure 12.

Inspect and clean the brine tank and filter screen on end of brine pickup tube once a year or when sediment appears in the bottom of the brine tank.

Clean the injector, injector screen and refill/backwash control once a year as follows:

1. Disconnect electrical power to the unit.
2. Shut off the water supply or put bypass valve(s) into bypass position.
3. Relieve resin tank pressure:
 - A. Remove control valve cover.
 - B. Press down on the top of the drive gear to disengage the cam gear.
 - C. With the cam gear disengaged, rotate the cam gear counterclockwise to the Backwash position.
4. Using a screwdriver, unscrew and remove the refill/backwash control. Clean and flush the control with a strong stream of water. Lubricate the O-rings with silicone lubricant and reinstall the control into the valve.
5. Using a screw driver, unscrew and remove the injector screen and injector cap.
6. Clean screen using a fine brush, flush until clean.
7. Using a needle nose pliers, pull injector straight out.
8. Flush water into the injector screen recess of the valve body to flush debris out through the injector recess.
9. Clean and flush the injector.
10. Lubricate the O-rings on the injector, injector cap and injector screen with silicone lubricant.
11. Reinstall the injector, injector cap and injector screen. **Do not overtighten the plastic cap.**
12. Rotate the cam gear counterclockwise to a position between Purge and Service, then slowly open the water supply valve or return the bypass valve(s) to the Service position.
13. Reconnect the electrical power to the unit. The cam gear will rotate until the switch lever opens, turning off the drive motor in the Service position.
14. Reset the time of day and reinstall the control valve cover.

Water Meter

In rare instances, the turbine wheel of the water meter can collect small particles of oxidized iron, eventually preventing the wheel from turning.

If the flow indicator light does not blink when conditioned water is flowing from the unit, it is an indication that the turbine wheel is not turning.

1. Disconnect electrical power supply to the unit.
2. Shut off the water supply or put the bypass valve(s) into bypass position.

3. Relieve resin tank pressure:
 - A. Remove control valve cover.
 - B. Press down on the top of the drive gear to disengage the cam gear.
 - C. With the cam gear disengaged, rotate the cam gear counterclockwise to the Backwash position.Check that there is no water flow through the drain line before performing service or preventative maintenance.
4. Disconnect the water conditioner from the plumbing.
5. Using needle-nose pliers, remove the outer gland and the turbine wheel from the outlet of the valve. Generally it will not be necessary to remove the inner gland.
6. Clean all iron deposits and/or debris off the turbine wheel. Excessive accumulation of iron may be removed from the components with a solution of sodium hydrosulfite (or sodium bisulfite). Rinse the components thoroughly in clean water after using the iron removal solution.
7. Flush accumulated iron deposits and/or debris from the inside of the valve outlet.
8. Reinstall the turbine wheel into the outlet side of the valve, being certain that the turbine wheel shaft is carefully seated into the bearing of the inner gland.
9. Carefully reinstall the outer gland into the outlet side of the valve. Check turbine rotation.
10. Reconnect the water conditioner to the plumbing and follow Initial Start-up, page 7.
11. Open a downstream faucet (conditioned water) and check to be certain that the flow indicator (colon) is blinking.

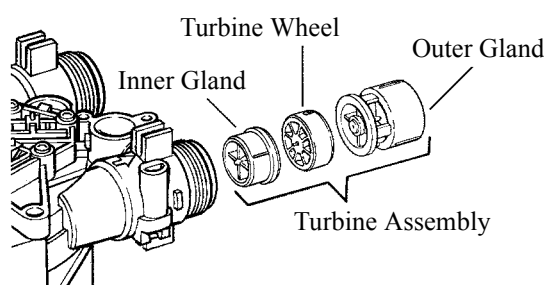


Figure 13

Disinfection of Water Conditioners

The construction materials of the water conditioning system do not support bacterial growth or contaminate the water supply. However, we recommend that the conditioner be disinfected after installation and before the conditioner can become fouled with organic matter during normal usage or with bacteria from the water supply. Periodic disinfection is recommended for all conditioners. Use one of the following methods of disinfection based on operating conditions, style of conditioner, type of resin, and disinfectant available.

Sodium Hypochlorite 5.25%

Sodium Hypochlorite solutions can be used with polystyrene resin, synthetic gel zeolite, greensand, and bentonites and re available under trade names such as Clorox*. Adjust the dosage if stronger commercial solutions are used.

The recommended dosage for 5.25% solutions is:

- Polystyrene resin: 1.2 fluid ounces per cubic foot.
- Non-resinous exchangers: 0.8 fluid ounce per cubic foot.

Complete the following steps to disinfect the conditioner: Add the sodium hypochlorite solution to the brine well of the brine tank. Make sure that the brine tank has water in it so the solution is carried into the conditioner. Proceed with normal regeneration. Refer to the Manual Regeneration section.

*Clorox is a trademark of the Clorox Co.

Riser Pipe Assembly

The dimensions provided here will make it easy for assemblers to cut the riser pipe when building the TechneticPlus softeners.

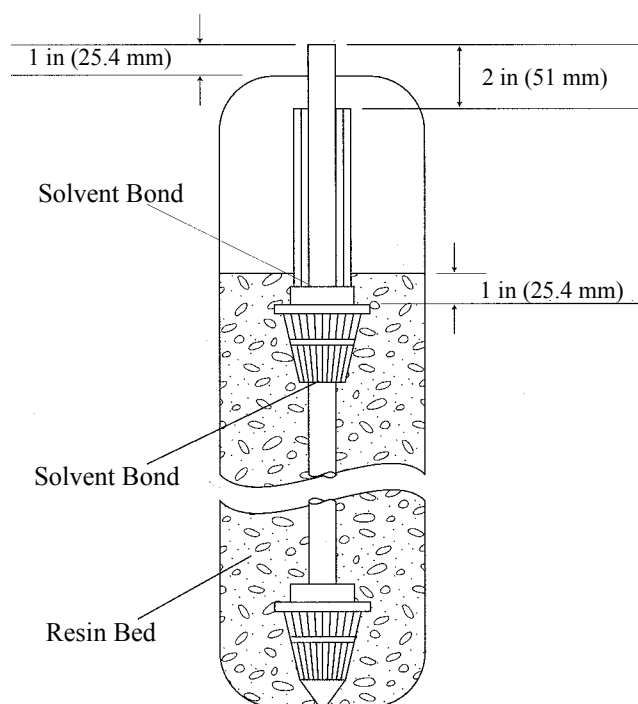


Figure 14

Outside Diameter

Inner Pipe	1.050 ± 0.004 in 26.67 ± 0.10 mm
Outer Pipe	1.315 ± 0.005 in 33.40 ± 0.13 mm

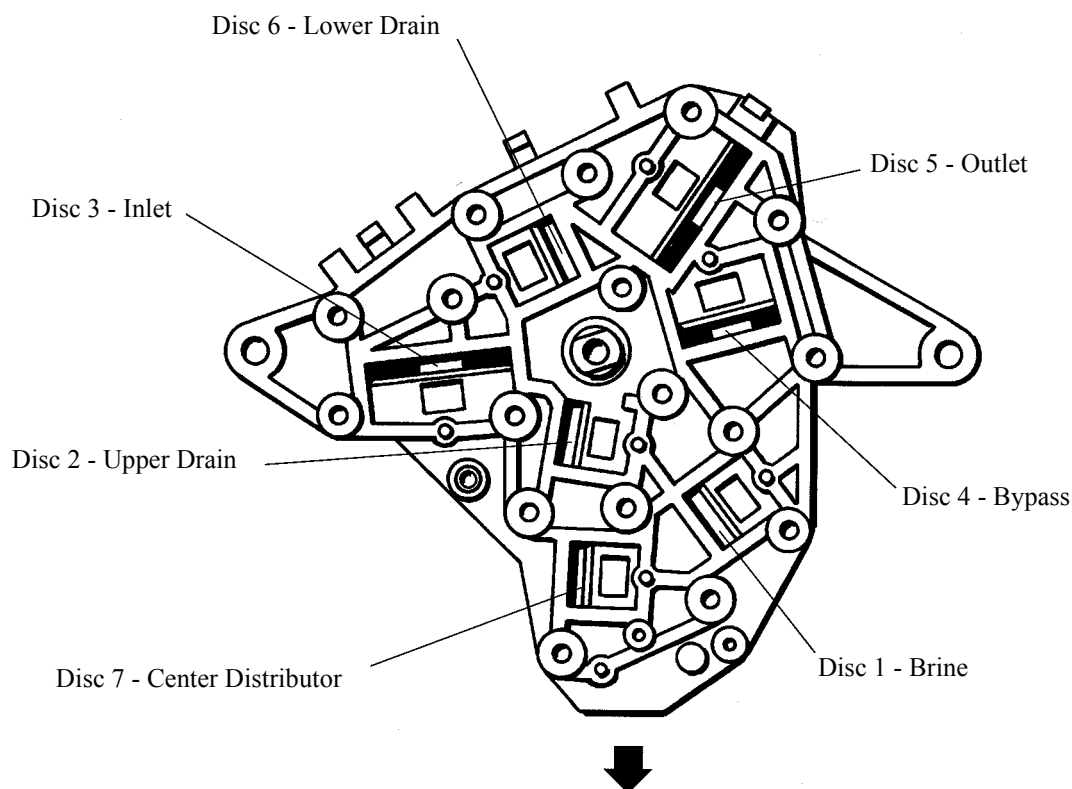
Wall Thickness

Inner Pipe	$0.060 + 0.020$ in - 0.000 in $1.52 + 0.51$ mm - 0.00 mm
Outer Pipe	$0.063 + 0.020$ in - 0.000 in $1.60 + 0.51$ mm - 0.00 mm

Specifications

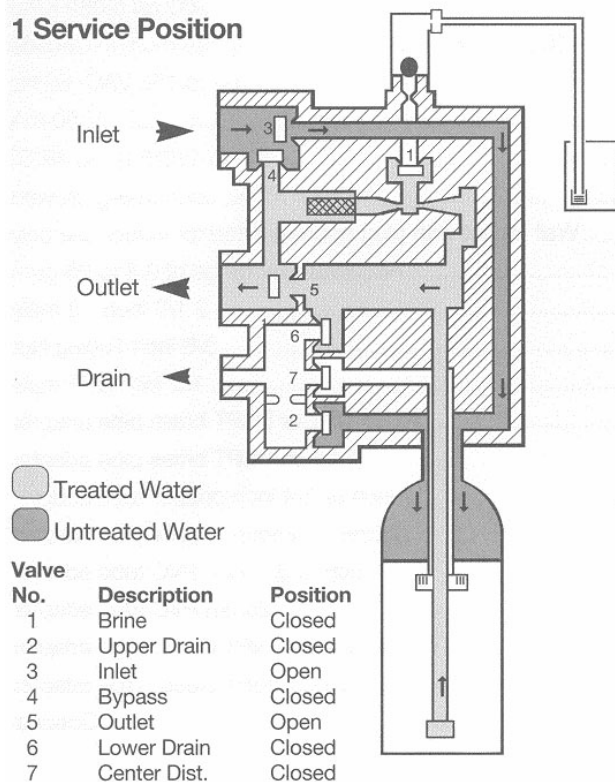
Hydrostatic Test Pressure	300 psi (2069 bar)
Working Pressure	20 to 120 psi (138 to 827 bar), 100 psi maximum in Canada
Voltage	102 to 132 VAC, 60 Hz
Current	50 mA
Operating Temperature	34° to 120°F (1° to 49°C)
Humidity	10% to 100%, condensing allowed
Transformer	Wall-mount with plug options, rated for indoor use only
Water Flows	Accurate over range of 0.5 to 23 gpm
Pressure Tank Thread	2 1/2 inch - 8 male
Brine Line Connection	3/8-inch Tubing Nut
Drain Line Thread	1/2-inch NPT male
Service Connections	1-inch NPT or BSPT brass pipe adapter 3/4-inch BSPT brass pipe adapter 1-inch or 3/4-inch copper tube adapter 22-mm or 28-mm copper tube adapter 1-inch or 3/4-inch PVC tube adapter 25-mm PVC tube adapter 1-inch or 3/4-inch NPT plastic pipe adapter 1-inch or 3/4-inch BSPT plastic pipe adapter
Bypass Valve	Optional

Valve Disc Identification

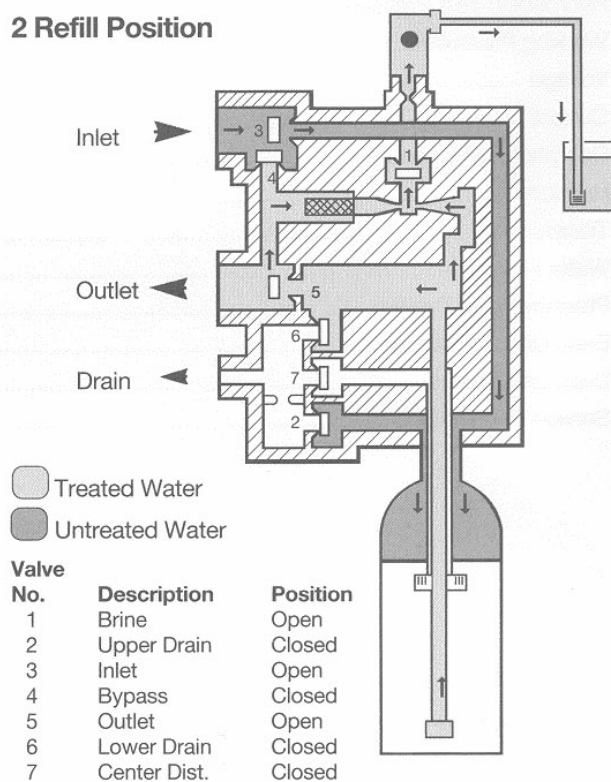


Flow Diagrams

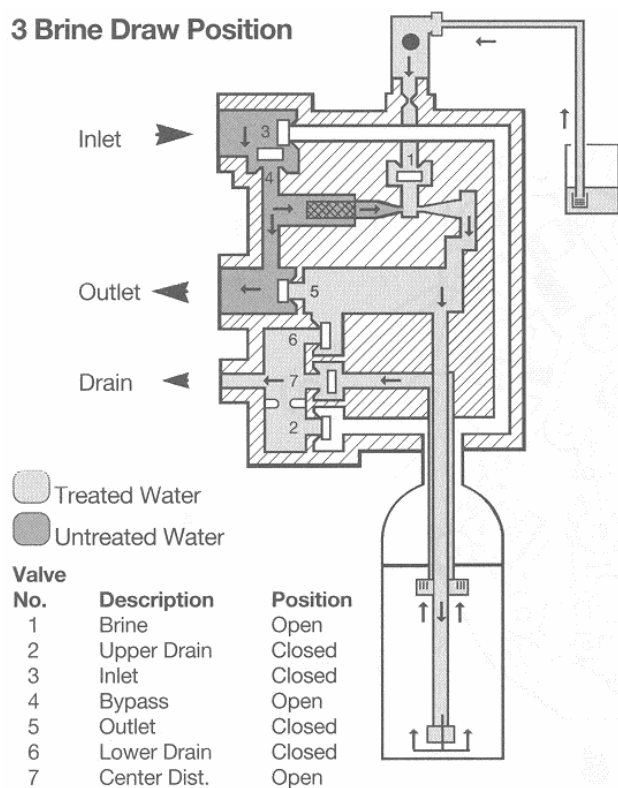
1 Service Position



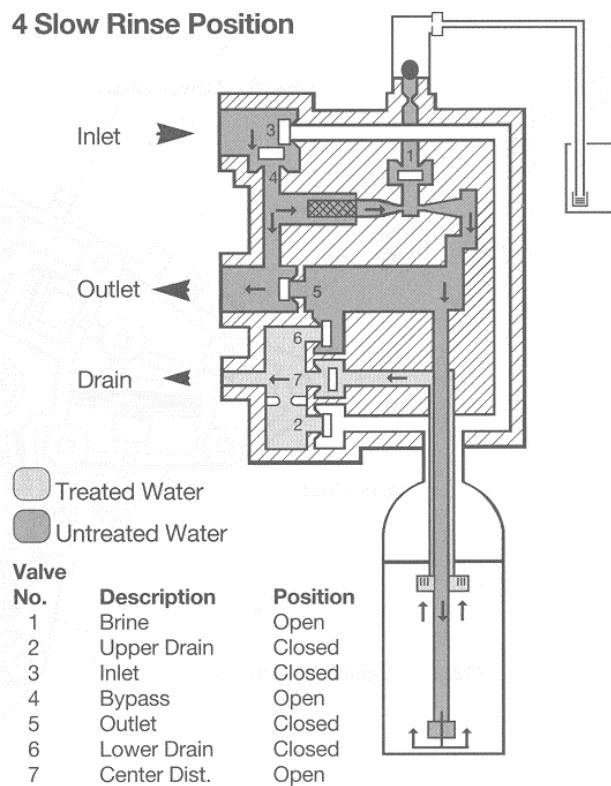
2 Refill Position



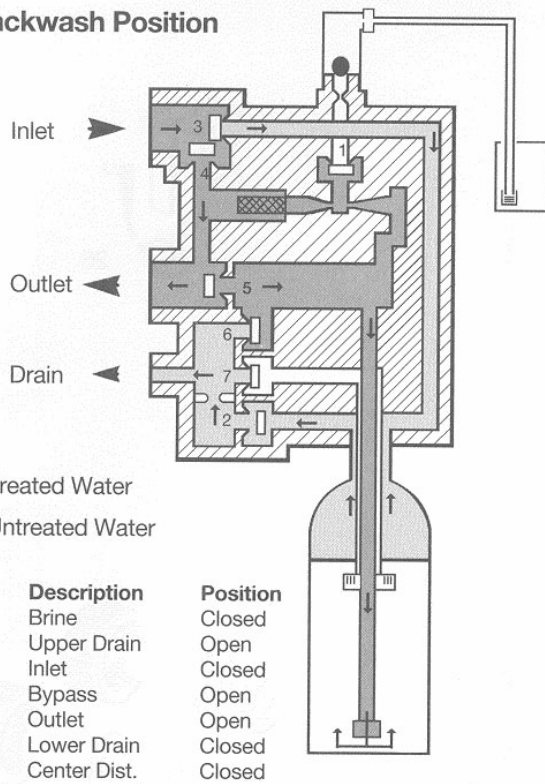
3 Brine Draw Position



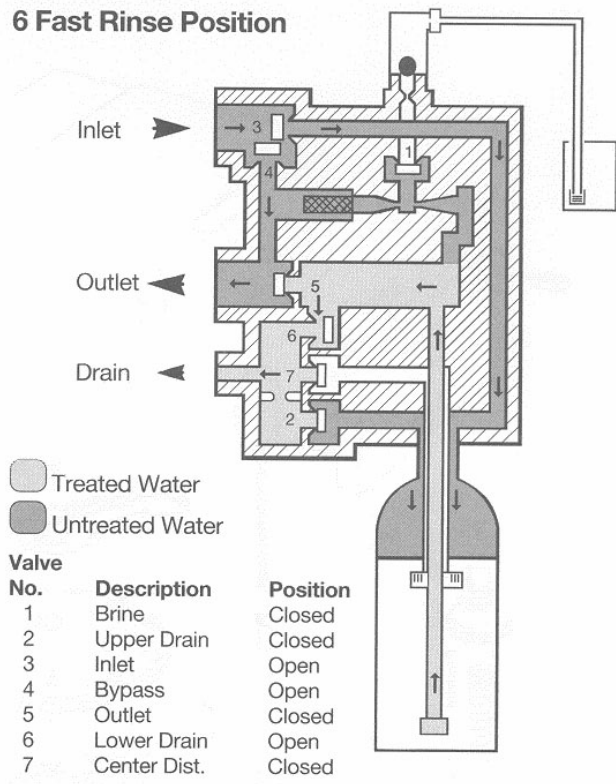
4 Slow Rinse Position



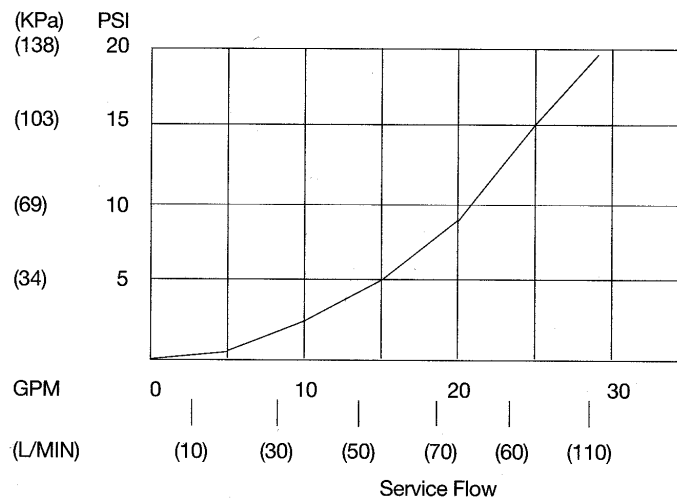
5 Backwash Position



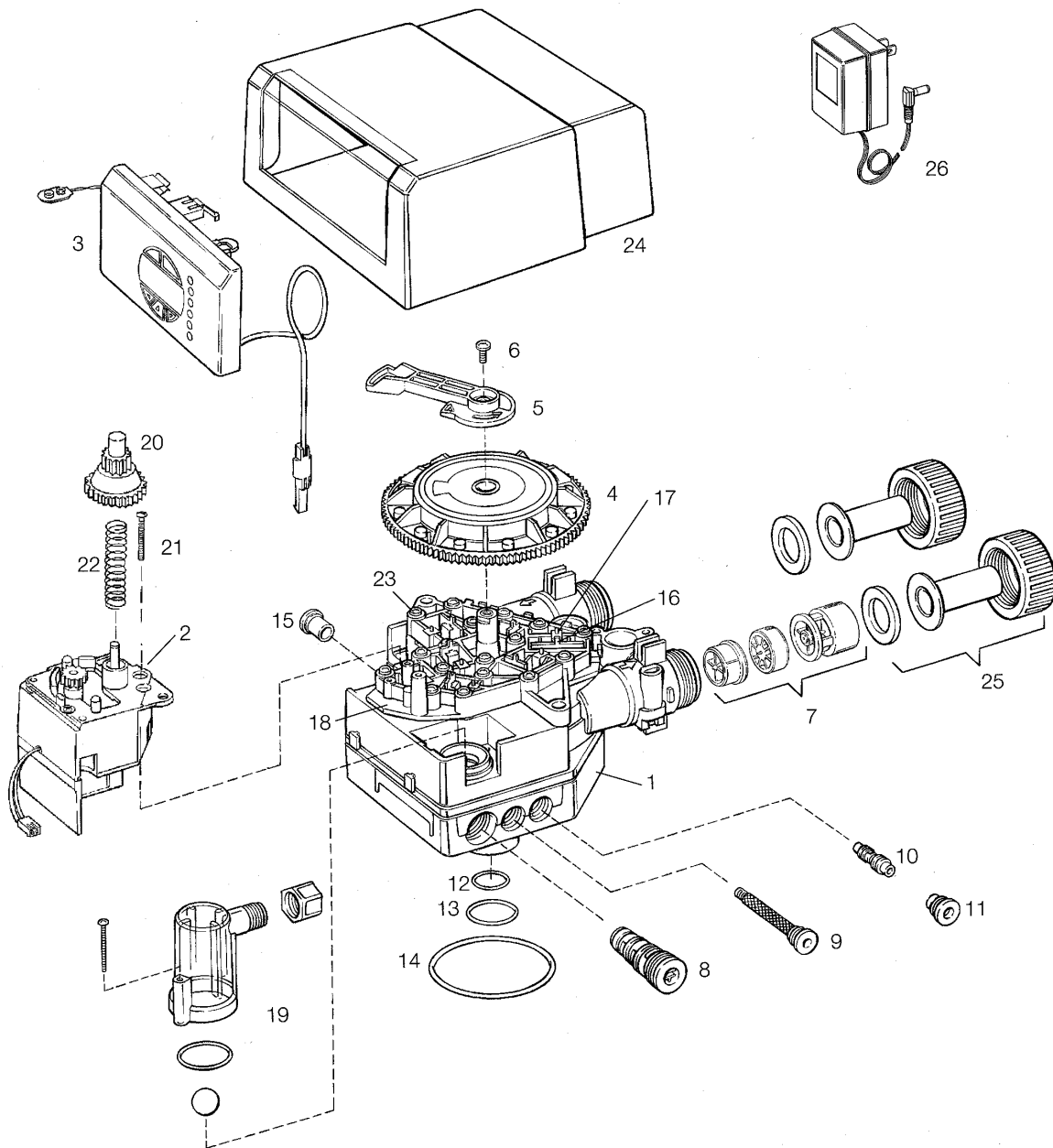
6 Fast Rinse Position



Pressure Loss Characteristics

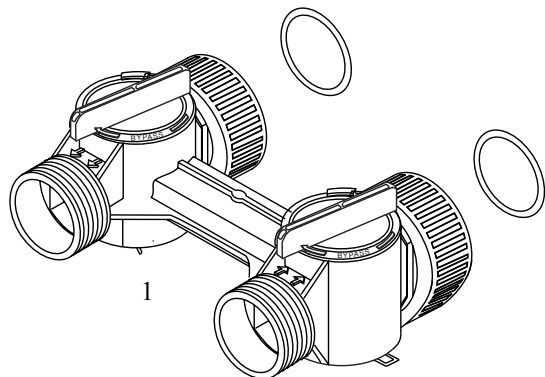


1100 Valve Body



Part				Part			
Code	No.	Description	Qty.	Code	No.	Description	Qty.
1	1034448	Valve Body Assembly	1	16	1040717	Valve Disc Kit	1
2	1034347	Motor Drive Assembly, 60 Hz	1	17	1001580	Valve Disc Spring	11
	1034346	Motor Drive Assembly, 50 Hz	1	18	1034360	Top Plate Assembly with Springs	1
3	1034424	Control Assembly, 1000i , English	1	19	1032416	Air Check Kit	1
4	1034362	Cam Gear, 1100 English	1	20	1032250	Drive Gear	1
	1034363	Cam Gear, 1100 Symbols	1	21	1006002	Screw, 8-18 x 1-1/2 inch	2
5	1032881	Bracket	1	22	1031118	Spring	1
6	1005001	Screw, 10-32 x 1/2 inch	1	23	1006093	Top Plate Screw	17
7	1033670	Turbine Group	1	24	1033998	Black Cover	1
8	1034337	7-inch Brine/backwash Control	1		1033996	Beige Cover	1
	1034338	8-inch Brine/backwash Control	1	25	1001606	3/4-inch Copper Tube Adapter Kit	1
	1034339	9-inch Brine/backwash Control	1		1001670	1-inch Copper Tube Adapter Kit	1
	1034340	10-inch Brine/backwash Control	1		1001608	22-mm Copper Tube Adapter Kit	1
	1034341	12-inch Brine/backwash Control	1		1001609	28-mm Copper Tube Adapter Kit	1
	1034342	13-inch Brine/backwash Control	1		1001613	3/4-inch CPVC Tube Adapter Kit	1
	1034343	14-inch Brine/backwash Control	1		1001614	1-inch CPVC Tube Adapter Kit	1
9	1032988	Injector Screen Assembly	1		1001615	25-mm CPVC Tube Adapter Kit	1
10	1032976	Injector Assembly, 1 Bump	1		1001769	3/4-inch NPT Plastic Pipe Adapter Kit	1
	1032984	Injector Assembly, 2 Bumps	1		1001603	1-inch NPT Plastic Pipe Adapter Kit	1
	1032979	Injector Assembly, 3 Bumps	1		1001604	3/4-inch BSPT Plastic Pipe Adapter Kit	1
	1032977	Injector Assembly, 4 Bumps	1		1001605	1-inch BSPT Plastic Pipe Adapter Kit	1
	1032980	Injector Assembly, 5 Bumps	1		1001611	3/4-inch BSPT Brass Pipe Adapter Kit	1
	1032982	Injector Assembly, 6 Bumps	1		1001610	1-inch NPT Brass Pipe Adapter Kit	1
	1032981	Injector Assembly, 7 Bumps	1		1001612	1-inch BSPT Brass Pipe Adapter Kit	1
	1032983	Injector Assembly, 8 Bumps	1	26		Wall-mount Transformer:	1
11	1032985	Injector Cap Assembly	1		1000810	100V Japanese Plug	
12	1010140	O-Ring, 1 x 1-1/4 x 1/8 inch	1		1000811	120V North American Plug	
13	1010129	O-Ring, 1-5/16 x 1-1/2 x 3/32 inch	1		1000812	220V Australian Plug	
14	1010429	O-Ring, 3-1/8 ID, 3/16 inch	1		1000813	220V British Plug	
15	1009056	Cap plug, Black, 1/2 inch	1		1000814	220V European Plug	

Series 1265 Bypass Valve



Code	Part No.	Description	Qty. Req.
1	1040930	1265 Bypass	1

Troubleshooting

The control valve may be manually indexed to each regeneration position as follows:

1. Remove the control valve cover, Figure 7.
2. Press down on the top of the drive gear to disengage the cam gear, Figure 8.
3. With the cam gear disengaged, rotate the cam gear counterclockwise to the various positions, Figure 9.

The control valve may also be operated in a fast mode for testing the control. To activate the fast mode, follow steps 1 and 2 outlined above to disengage the cam gear. When the cam gear is disengaged, it should be advanced slightly in a counterclockwise direction. The switch will then activate the motor to cause the cam gear to advance through all the cycles

in about

30 minutes. The control will not recognize a fast mode as a regeneration. Manual regenerations can be initiated only by pressing the manual regeneration switch on the face of the control.

Alarms

The Technetic Plus continuously monitors itself and displays an error message if it detects something wrong.

When an error is detected, the display shows the letters "Err" with a number from 1 to 4. Table 6 lists Err numbers, a description of each error, the cause of the error, and the solutions. To clear the error from the display, press any button on the control. If the error still exists, the control will display the error message again after 30 seconds.

Table 6 - Technetic Plus Errors

Indication	Description	Cause	Solution
Err1	Electronics failure.	Control settings need reprogramming.	Press any key to load default values. Err 1 Refer to "Programming the Technetic Plus 1100 Control".
Err2	Improper start of regeneration (limit switch open when it should be closed).	Valve cam gear has been manually rotated during a regeneration. Valve cam gear has been manually rotated out of Service position. Faulty motor. Faulty motor drive. Faulty switch	Press any key to clear the alarm. (Note: Alarm automatically clears at "TIME OF REGEN"). The control will turn the motor on and drive the cam gear to the proper location. Replace motor assembly. Replace motor assembly. Replace switch.
Err3	Improper finish of regeneration (limit switch closed when it should be open).	Valve cam gear has been manually rotated out of Service position. Faulty motor. Faulty motor drive. Faulty switch.	The control will turn the motor on and drive the cam gear to the proper location. Replace motor assembly. Replace motor assembly. Replace switch.
Err4	Improper control settings (one or more settings out of the allowable range).	One or more settings out of the allowable range.	Hardness: Adjust range: 3 to 250. Capacity: Adjust range: 0.1 to 140.0 Refill control: Adjust range per Table 4. Brine Draw Value: Adjust range per Table 4.

Table 7 - Troubleshooting Procedures

Problem	Possible Cause	Solution
1. Capacity display stays at 9999 even through there is water usage.	a. Total system capacity was calculated to be a value greater than 9999.	a. As the water usage continues, the remaining capacity will drop below 9999 and then other values will be shown.
2. Control does not respond to REGEN button.	a. Button is not active in the programming mode.	a. Refer to the Regeneration section.
3. Control does not display time of day.	a. Transformer unplugged. b. No electric power at outlet. c. Defective transformer. d. Defective circuit board.	a. Connect power. b. Repair outlet or use working outlet. c. Replace transformer. d. Replace control.
4. Control does not display correct time of day.	a. Outlet operated by a switch. b. Power outages.	a. Use outlet not controlled by switch. b. Reset Time of Day and replace battery.
5. Now water flow display when water is flowing (colon does not blink).	a. Bypass valve in bypass position. b. Meter probe disconnected or not fully connected to meter housing. c. Restricted meter turbine rotation due to foreign material in meter. d. Defective meter probe. e. Defective circuit board.	a. Shift bypass valve into service position. b. Fully insert probe into meter housing. c. Remove meter housing, free up turbine and flush with clean water. Turbine should spin freely. If not, refer to the Water Meter Maintenance section. d. Replace control. e. Replace control.
6. Control display is frozen at Regen Time Remaining.	a. Back to back regenerations were requested.	a. Refer to Manual Regeneration section.
7. Control regenerates at the wrong time of day.	a. Power outages. b. Time of day set incorrectly. c. Time of regeneration set incorrectly.	a. Reset time of day to correct time of day and replace battery. b. Reset time of day to correct time of day. c. Reset time of regeneration.
8. Cam Gear stalled in regeneration cycle.	a. Motor not operating. b. Motor runs backwards. c. No electric power at outlet. d. Incorrect voltage or frequency (Hz). e. Broken gear. f. Defective switch. g. Binding of cam gear. h. Water pressure greater than 125 psi during regeneration. i. Defective circuit board.	a. Replace motor assembly. b. Replace motor assembly. c. Repair outlet or use working outlet. d. Replace timer and/or transformer with one of correct voltage and frequency (Hz). e. Replace gear. f. Replace switch. g. Remove foreign object obstruction from valve discs or cam gear. h. Install pressure regulator to reduce pressure. i. Replace control.
9. Continuous regeneration. Cam gear does not stop at the end of regeneration.	a. Defective switch.	a. Replace switch.
Problem	Possible Cause	Solution

Table 7 - Troubleshooting Procedures

10. Control does not regenerate automatically or when REGEN button is depressed.	<ul style="list-style-type: none"> a. Transformer unplugged. b. No electric power at outlet. c. Defective motor. d. Defective switch. 	<ul style="list-style-type: none"> a. Connect power. b. Repair outlet or use working outlet. c. Replace motor assembly. d. Replace switch.
11. Control does not regenerate automatically but does regenerate when REGEN button is depressed.	<ul style="list-style-type: none"> a. If water flow display is not operative, refer to item 5 in this table. b. Incorrect hardness and capacity settings. c. Defective circuit board. 	<ul style="list-style-type: none"> a. Refer to item 5 in this table. b. Set new control values. Refer to the Programming section. c. Replace control.
12. Run out of soft water between regenerations.	<ul style="list-style-type: none"> a. Improper regeneration. b. Fouled resin bed. c. Incorrect salt setting. d. Incorrect hardness or capacity settings. e. Water hardness has increased. f. Restricted meter turbine rotation due to foreign material in meter housing. g. Water usage below 1/5 gallon per minute. h. Brine draw value from Table 4 is incorrect. i. Incorrect salt type, or use of grid plate (salt shelf). 	<ul style="list-style-type: none"> a. Repeat regeneration making certain that correct salt dosage is used. b. Use resin cleaner. c. Set salt setting to proper level. Refer to the Programming section in this manual. d. Set to correct values. Refer to the Programming section of this manual. e. Set to new value. Refer to the Programming section of this manual. f. Remove meter housing, free up turbine, and flush with clean water. Turbine should spin freely, if not, replace meter. g. Repair leaky plumbing and/or fixtures. h. Set correct brine draw value. i. Do not use block salt or grid plate (salt shelf) in brine tank.
13. Control does not draw brine	<ul style="list-style-type: none"> a. Low water pressure. b. Restricted drain line. c. Injector or injector screen plugged. d. Injector defective. e. Valve disc 3 and/or 5 not closed. f. Air check valve prematurely closed. 	<ul style="list-style-type: none"> a. Increase water pressure (20 psi at conditioner). b. Remove obstruction. c. Clean injector and screen. Refer to the Cleaning the Injector/Injector Screen section in this manual. d. Replace injector and cap. e. Manually operate cam gear to flush out foreign matter holding disc open. Replace if needed. f. Briefly put control into brine refill status. Refer to the Manual Regeneration section in this manual. Replace or repair air check valve if needed.
14. Brine tank overflow.	<ul style="list-style-type: none"> a. Brine valve disc 1 held open. b. Valve disc 2 not closed during brine draw, causing brine refill. c. Air leak in brine line to air check. d. Salt setting too high. 	<ul style="list-style-type: none"> a. Manually operate cam gear to flush out foreign matter holding disc open. b. Manually operate cam gear to flush out foreign matter holding disc open. c. Check all connections in brine line for leaks. d. Set in new values. Refer to Programming section in this manual.
Problem	Possible Cause	Solution

Table 7 - Troubleshooting Procedures

15. Intermittent or irregular brine draw.	<ul style="list-style-type: none">a. Low water pressure.b. Defective injector.	<ul style="list-style-type: none">a. Increase water pressure (20 psi at conditioner).b. Replace both injector and injector cap.
16. No conditioned water after regeneration.	<ul style="list-style-type: none">a. Unit did not regenerate.b. No salt in brine tank.c. Plugged injector.d. Air check valve closed prematurely.e. Incorrect salt type or use of grid plate (salt shelf) in brine tank.	<ul style="list-style-type: none">a. Check for power.b. Add salt to brine tank.c. Remove injector and flush it and injector screen.d. Put control momentarily into REFILL to free air check. Replace or repair air check if needed. Refer to instructions.e. Do not use block salt or grid plate (salt shelf) in brine tank.
17. Control backwashes at excessively low or high rate.	<ul style="list-style-type: none">a. Incorrect backwash controller.b. Foreign matter affecting controller operation.	<ul style="list-style-type: none">a. Replace with correct size controller.b. Remove and clean controller.
18. Flowing or dripping water at drain line or brine line after regeneration.	<ul style="list-style-type: none">a. Drain valve (2 or 6) or brine valve (1) held open by foreign matter.b. Weak valve stem return spring on top plate.c. Resin in valve.	<ul style="list-style-type: none">a. Manually operate cam gear to flush out foreign matter holding disc open.b. Replace spring.c. Clean valve and backwash control.
19. Hard water leakage during service.	<ul style="list-style-type: none">a. Improper regeneration.b. Leaking of bypass valve.c. O-ring around riser tube damaged.d. Incorrect salt type or use of grid plate (salt shelf) in brine tank.	<ul style="list-style-type: none">a. Repeat regeneration making sure that the correct salt dosage is used.b. Replace O-ring.c. Replace O-ring.d. Do not use block salt or grid plate (salt shelf) in brine tank.